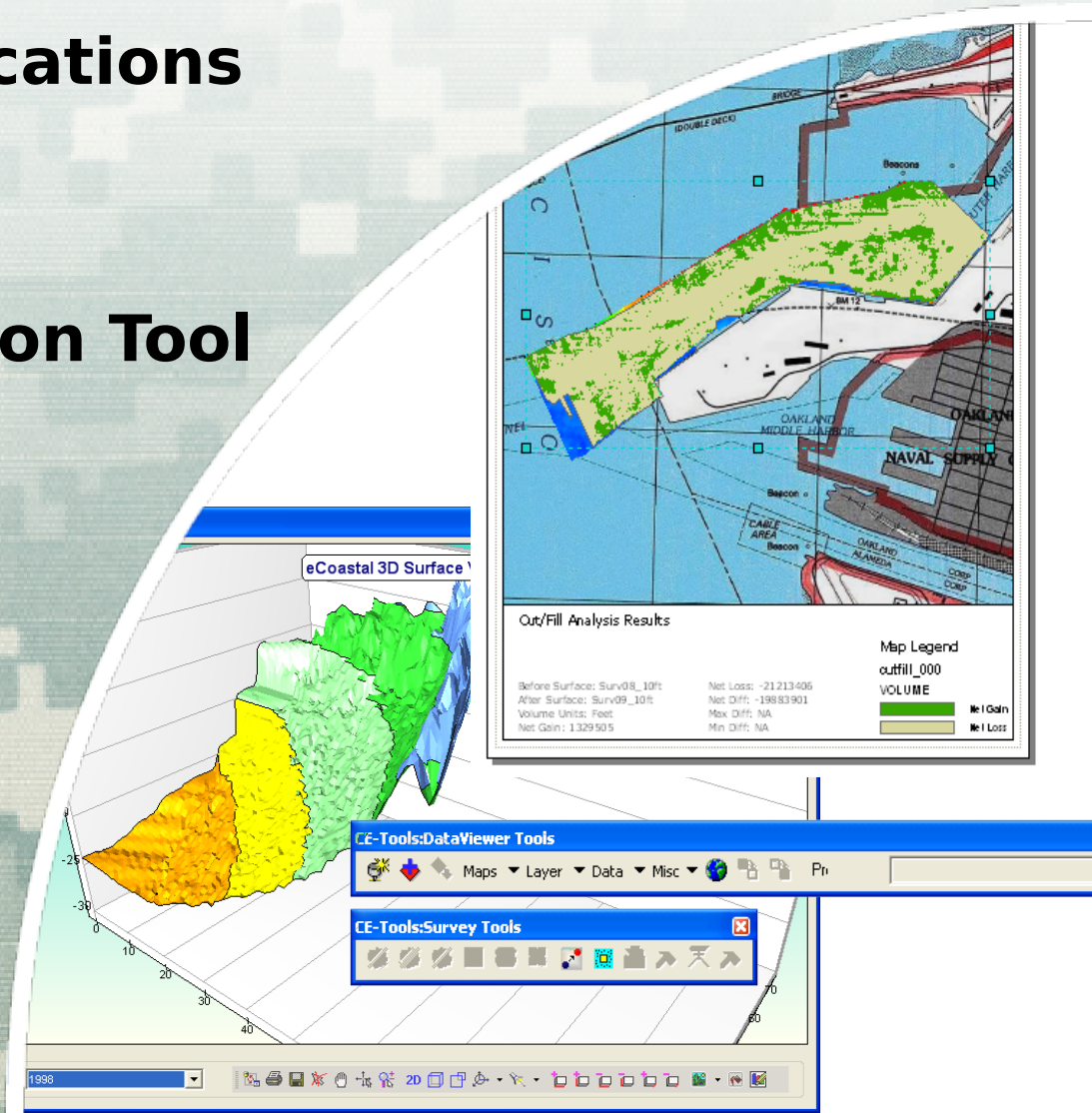
eCoastal Desktop Tools

Custom ArcGIS Applications

Data Viewer Tools
Survey Tools
Shoreline Classification Tool
CoSCA
SBAS-A
SUDS



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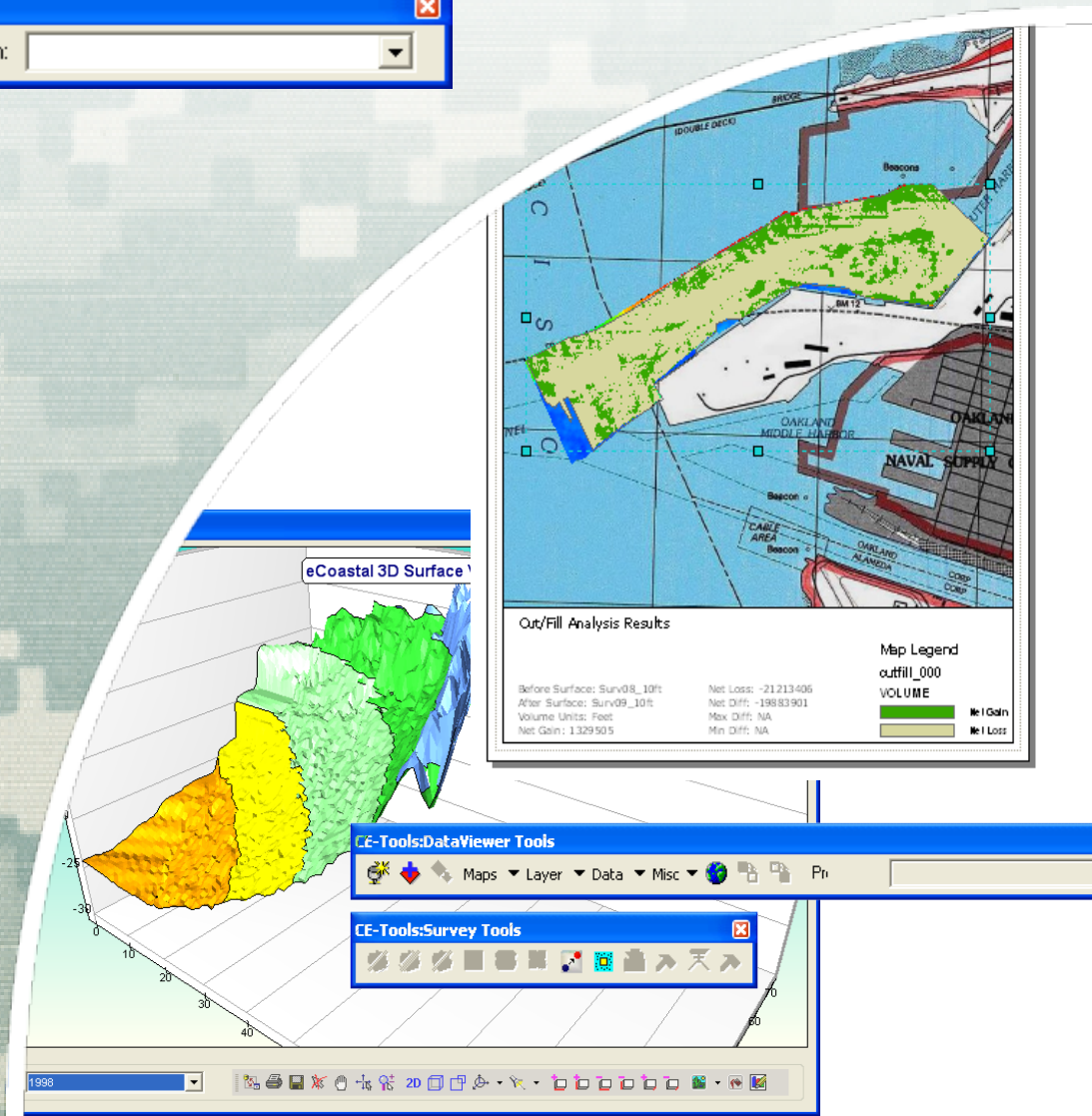
Toolbar Installation

- Most functions of the eCoastal toolset do not require any other setup, other than simple installation (admin rights required)
- Toolbars are now organized under “CE-Tools” (Corps of Engineers Tools), since many functions can be applied to multiple themes of data.

Data Viewer Toolbar



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Data Viewer Tools

- The Data Viewer toolbar contains a number of tools that can be use in your ArcMap session.
- These tools are designed to assist you with common functions, like loading data, building a map, or rearranging the items in your table of contents.
- The Data Picker tool does require the setup and management of a supporting database.

Data Viewer Toolbar

	Toolbar: eCoastal DataViewer **Tool: Database Connections** Function: This form allows a user to select a connection to the GIS Management Database. Additionally, references for spatial and non-spatial servers are established here. A working "scratch" location must also be set here to allow for a working directory on a user's local computer.		**Toolbar: eCoastal DataViewer** **Tool: Data Picker** Function: Data indexed in the GIS Management Database can be easily accessed using the Data Picker tool. This GUI interface allows users of all user levels the ability to quickly search available layers and directly add items to the Table of Contents in ArcMap without prior knowledge of the Spatial Data Standards to browse the geodatabase with little introduction to the system architecture.
	Toolbar: eCoastal DataViewer **Tool: Zoom To Layer** Function: Allows a user to quickly zoom to the extents of the layer in the table of contents selected by the user. The Zoom to Layer tool on the eGIS Data Viewer toolbar is different than the standard 'Zoom to Layer' function as it honors the spatial extent of the definition query used in the Layer file.		**Toolbar: eCoastal DataViewer** **Tool: Create Map Layout** Function: Allows a user to quickly and efficiently create a map layout suitable for printing and or plotting. This tool simplifies map printing by providing a user the option to select a printing device and then select a paper size. Pre-defined map scales are also available for choosing. Each change updates the map layout.

Data Viewer Toolbar

	Toolbar: eCoastal DataViewer **Tool: Find By Attribute** Function: Allows a user to search attributes contained in a vector feature layer by selecting from a list of distinct attribute values queried from the selected layer. Double-clicking on a value from the search list locates to the first feature by that value.		**Toolbar: eCoastal DataViewer** **Tool: Sort Layers** Function: Allows a user to sort all the layers in the table of contents alphabetically. The tool will honor grouped layers of any level.
	Toolbar: eCoastal DataViewer **Tool: Move Layers Up** Function: Allows a user to move any selected layers to the top of the table of contents.		**Toolbar: eCoastal DataViewer** **Tool: Move Layers Down** Function: Allows a user to move any selected layers to the bottom of the table of contents.
	Toolbar: eCoastal DataViewer **Tool: Delete Multiple Fields** Function: Allows a user to select a shape file on their computer. Once selected, a list of attribute fields is created from the shape file for final selection. All selected fields in the shape file are then deleted.		**Toolbar: eCoastal DataViewer** **Tool: Add X,Y Coordinates** Function: Automatically creates and populates an X and Y value column(s) in the attribute table of a selected vector layer using the coordinate system of the Data Frame properties. The Add XY tool is useful if a vector point layer was created using a "heads-up digitizing" technique or if a point data layer was acquired with no XY coordinates defined in the attribute table.

Data Viewer Toolbar

	Toolbar: eCoastal DataViewer **Tool: Import Excel as Points** Function: This tool imports from a selected Excel spreadsheet a worksheet that contains columns of data that can be queried as X and Y point data. The tool imports the data and creates a point feature layer into the map. Additional columns of data in the spreadsheet may be selected and will be included in the feature layer as attribute data.		**Toolbar: eCoastal DataViewer** **Tool: Export to Text File** Function: Allows users to easily export the feature attributes of a feature map layer to an ASCII comma-delimited text file. The tool can also be used to export the XY vertices of a polygon or polyline feature class to a text file. Additionally if the feature class is 3D, the Z value of the geometry is also included.
	Toolbar: eCoastal DataViewer **Tool: Polygon Area Tool** Function: Allows users to calculate the area, perimeter, and centroid of features in a polygon feature layer. The tool will also work with data that is in a geographic coordinate system.		**Toolbar: eCoastal DataViewer** **Tool: Graphics to Features** Function: This tool allows users to convert graphic elements (polygon, polyline, or point types) in the map to permanent feature classes of the same type of geometry.

Data Viewer Toolbar

	Toolbar: eCoastal DataViewer **Tool: Bounding Polygon Tool** Function: Bounding polygons are used to define the extent of surfaces to be calculated with the Spatial Analyst extension. This tool allows the user to create a boundary based on a feature point selection, and it creates a polygon graphic that surrounds the feature selection. The bounding polygon is a convex hull polygon.		**Toolbar: eCoastal DataViewer** **Tool: Compare Tool** Function: The main function of this tool, although not the only function, is to search the specified feature class for duplicate geometry. Any duplicate features are marked as duplicate with a Duplicate column that is added to the feature attribute table.
	Toolbar: eCoastal DataViewer **Tool: Make PointZ Shape** Function: Allows a user to select an ASCII comma-delimited text file that contains as minimum X, Y, and Z values that typically represent a location and an elevation. The resultant point shape file is z-aware, meaning it has 3D geometry.		**Toolbar: eCoastal DataViewer** **Tool: Make PolylineZ Shape** Function: Allows a user to select an ASCII comma-delimited text file that contains as minimum X, Y, and Z values that typically represent a location and an elevation. The X and Y values are used to create the polyline vertices. The resultant shape file is z-aware, meaning it has 3D geometry.
	Toolbar: eCoastal DataViewer **Tool: Polyline Tools** Function: The polyline tools are a collection of tools that modify polylines in a shapefile or create new features from existing features.		**Toolbar: eCoastal DataViewer** **Tool: Polygon to Polyline Tool** Function: This tool converts the selected polygon feature to a polyline feature.

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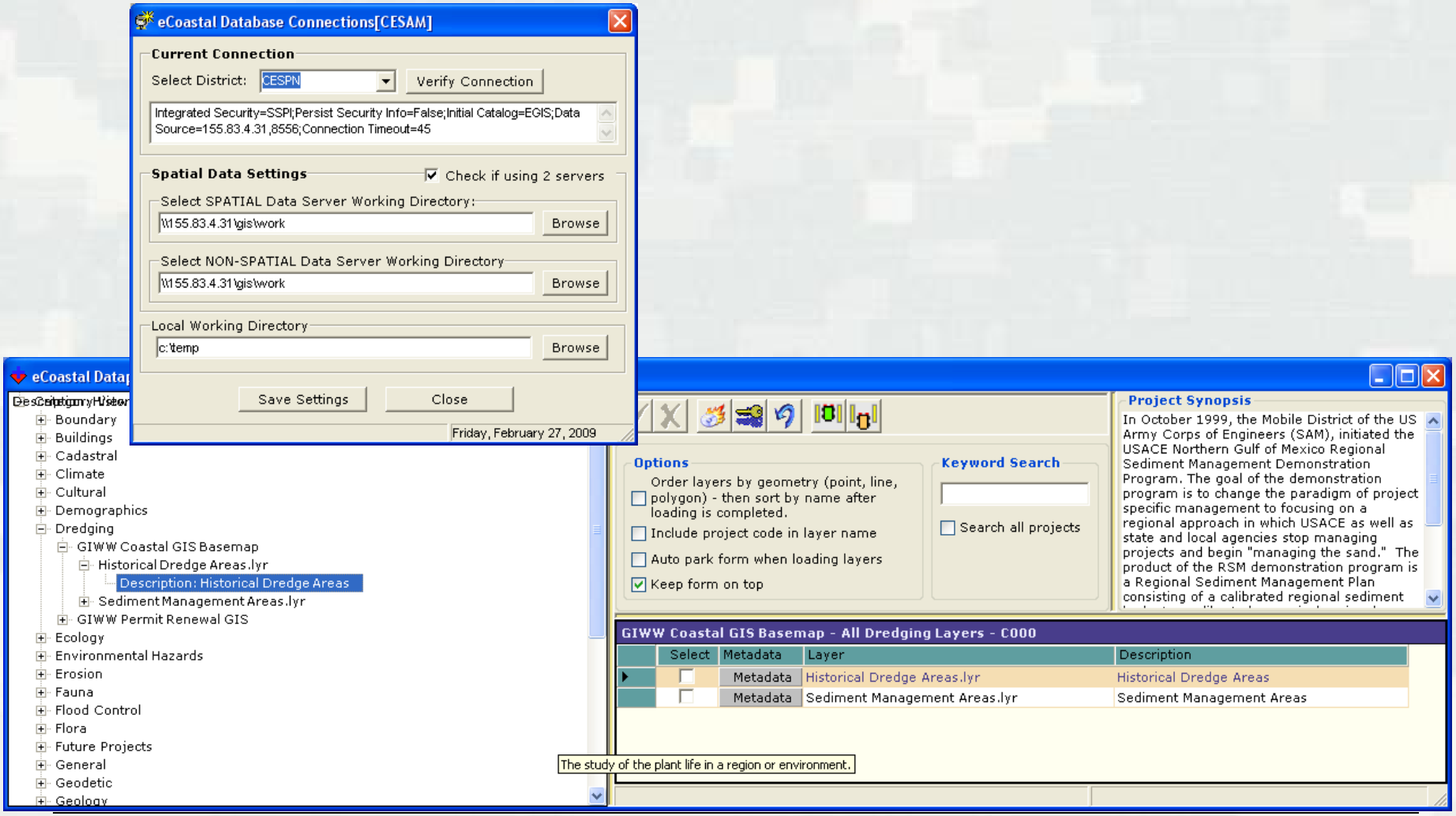
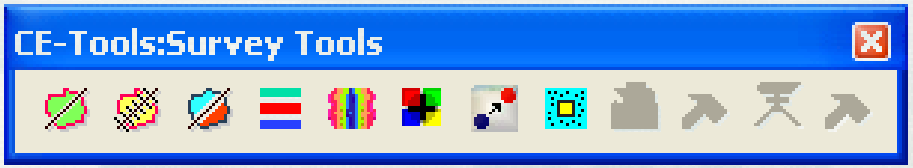
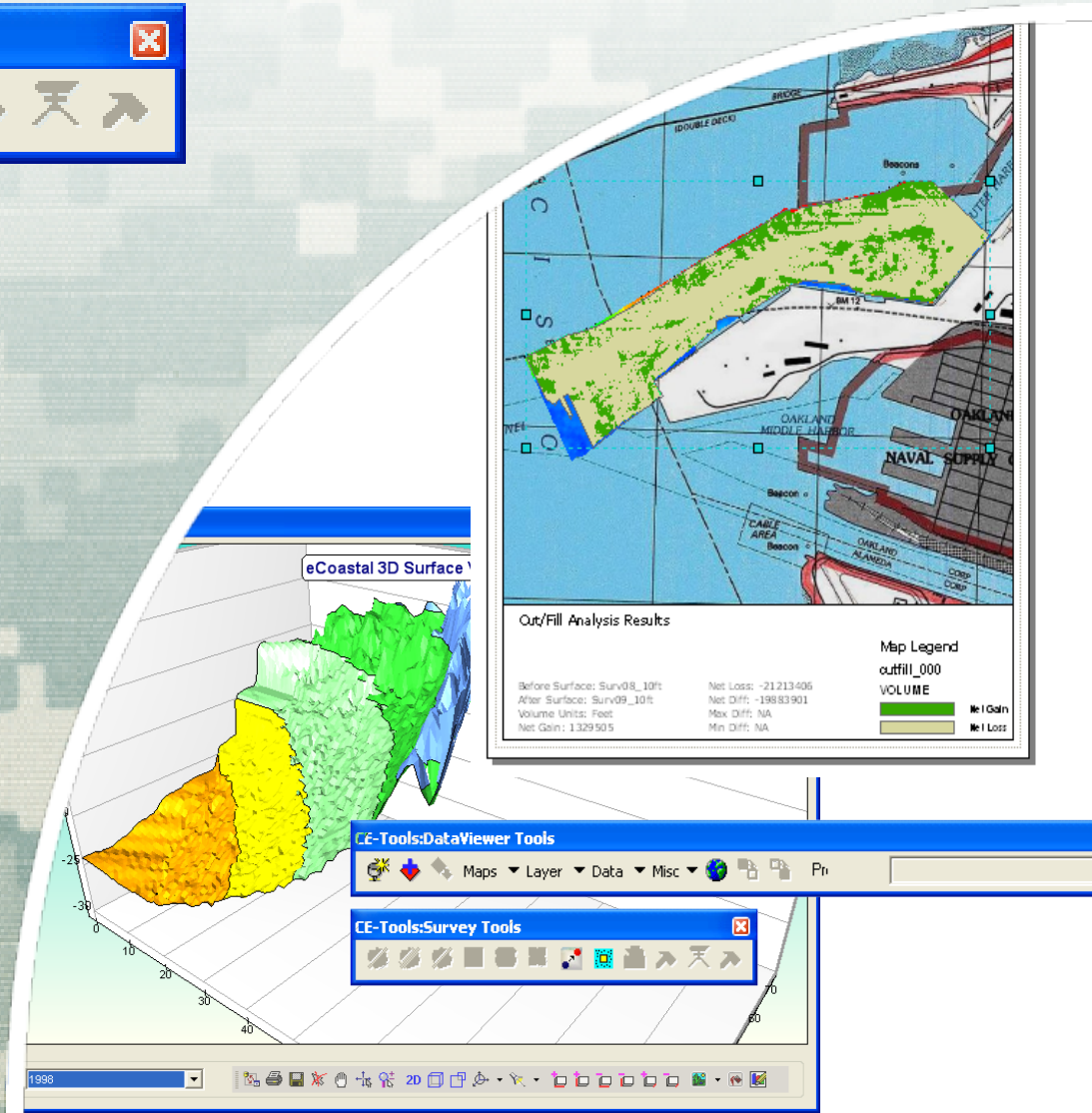
Data Picker Tool


eCoastal Database Connections[CESAM]
Current Connection
Select District:
CESPN
Verify Connection
Integrated Security=SSPI;Persist Security Info=False;Initial Catalog=EGIS;Data Source=155.83.4.31,8556;Connection Timeout=45
Spatial Data Settings
Check if using 2 servers
Select SPATIAL Data Server Working Directory:
\\155.83.4.31\gis\work
Browse
Select NON-SPATIAL Data Server Working Directory
\\155.83.4.31\gis\work
Browse
Local Working Directory
c:\temp
Browse
Save Settings
Close
Friday, February 27, 2009
Boundary
Buildings
Cadastral
Climate
Cultural
Demographics
Dredging
GIWW Coastal GIS Basemap
Historical Dredge Areas.lyr
Description: Historical Dredge Areas
Sediment Management Areas.lyr
GIWW Permit Renewal GIS
Ecology
Environmental Hazards
Erosion
Fauna
Flood Control
Flora
Future Projects
General
Geodetic
Geology
Options
Order layers by geometry (point, line, polygon) - then sort by name after loading is completed.
Include project code in layer name
Auto park form when loading layers
Keep form on top
Keyword Search
Search all projects
Project Synopsis
In October 1999, the Mobile District of the US Army Corps of Engineers (SAM), initiated the USACE Northern Gulf of Mexico Regional Sediment Management Demonstration Program. The goal of the demonstration program is to change the paradigm of project specific management to focusing on a regional approach in which USACE as well as state and local agencies stop managing projects and begin "managing the sand." The product of the RSM demonstration program is a Regional Sediment Management Plan consisting of a calibrated regional sediment
GIWW Coastal GIS Basemap - All Dredging Layers - C000
Select
Metadata
Layer
Description
Metadata
Historical Dredge Areas.lyr
Historical Dredge Areas
Metadata
Sediment Management Areas.lyr
Sediment Management Areas
The study of the plant life in a region or environment.

Survey Tools Toolbar





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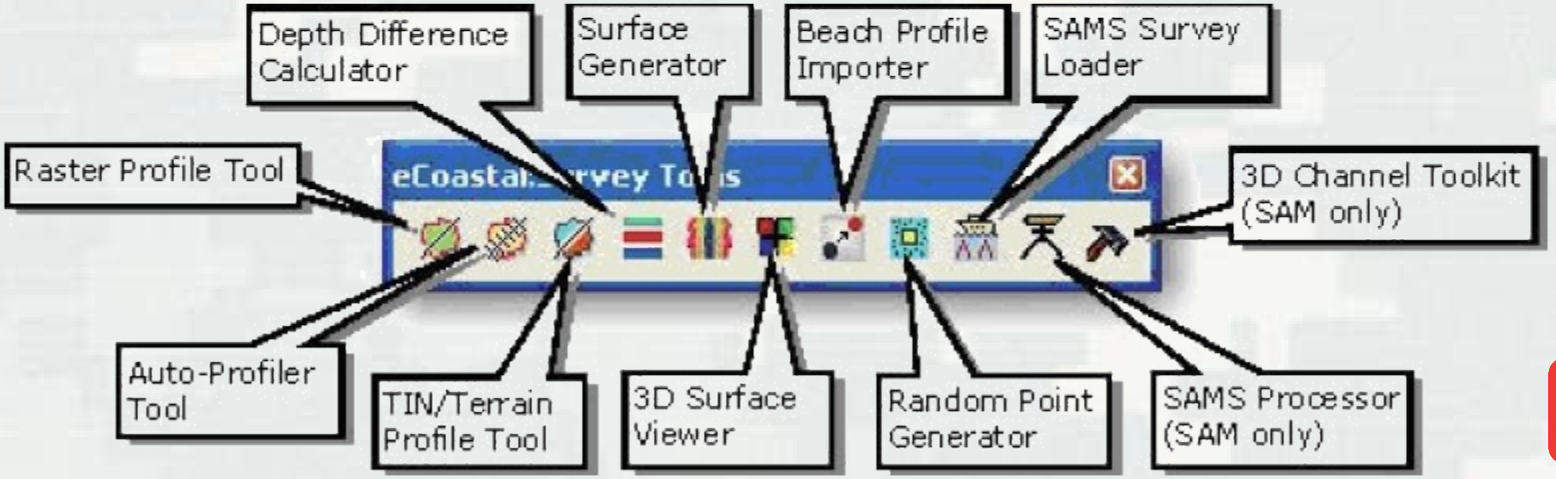
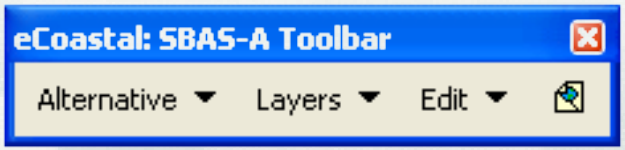
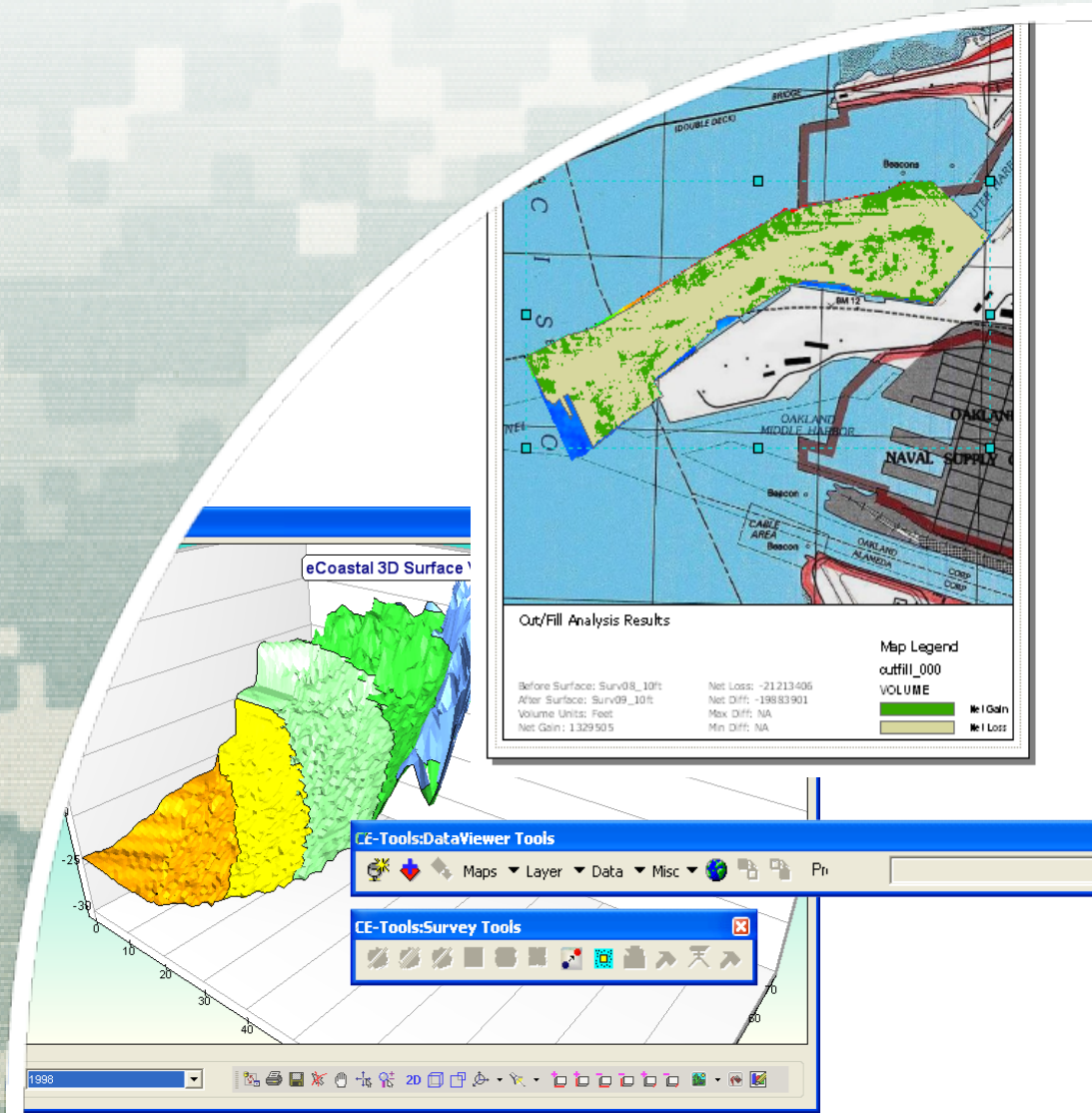
Survey Tools

- The survey tools are a collection of tools that allow for the design and analysis of raster grids, TIN surfaces, and the loading and analysis of hydrographic survey data. The tools require the use of the 3D Analyst and Spatial Analyst extensions for ArcMap.



SBAS-A Toolbar





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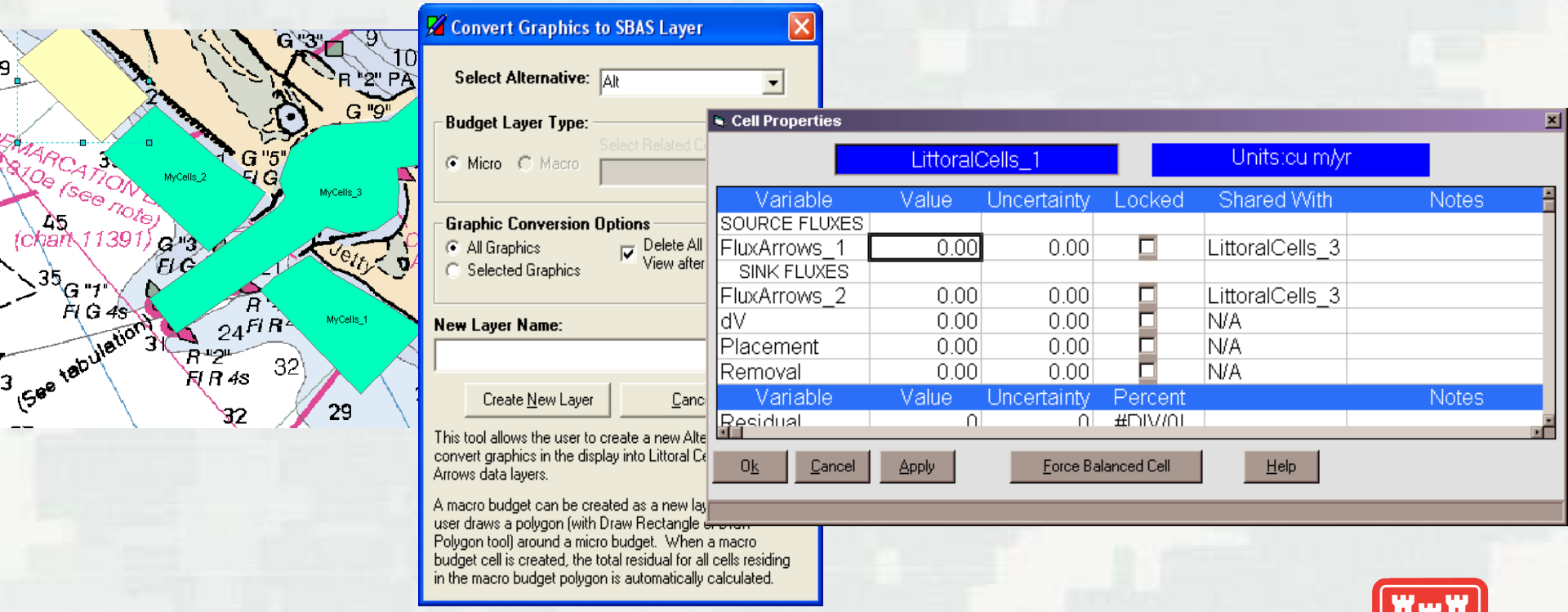
SBAS-A

- The **Sediment Budget Analysis System** (SBAS) provides a framework for formulating, documenting, and calculating sediment budgets, including estimation of uncertainty, hence the reliability of the budget.
- SBAS automatically formulates and substitutes these quantities into the sediment-budget equation based on the origin, terminus, and direction of arrows representing rates.

SBAS-A

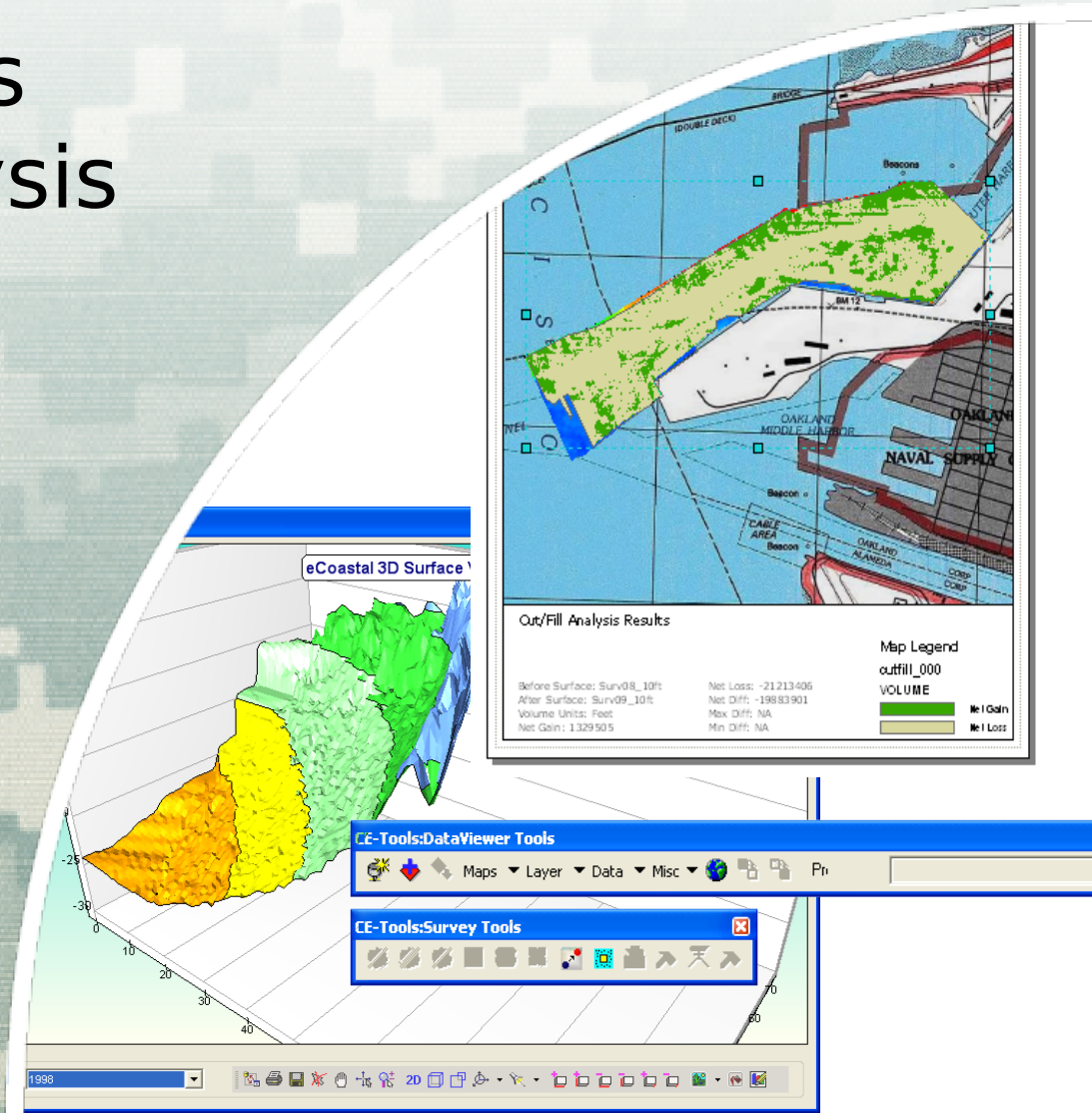
Sediment Budget Equation

$$\sum Q_{source} - \sum Q_{sink} - \Delta V + P - R = Residual$$



CoSCA

Coastal Structures Condition & Analysis Tool



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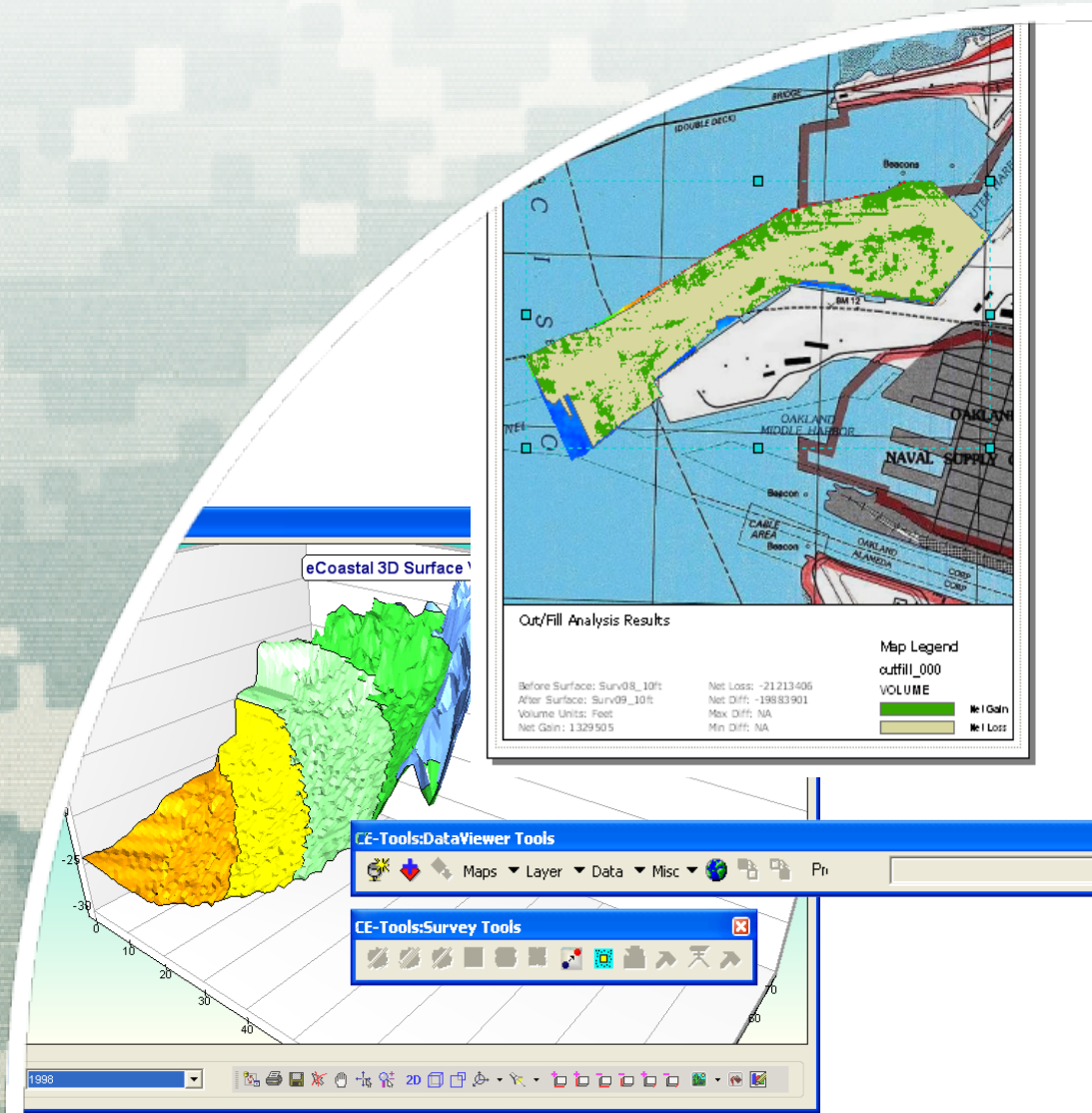
Shoreline Classification Tool



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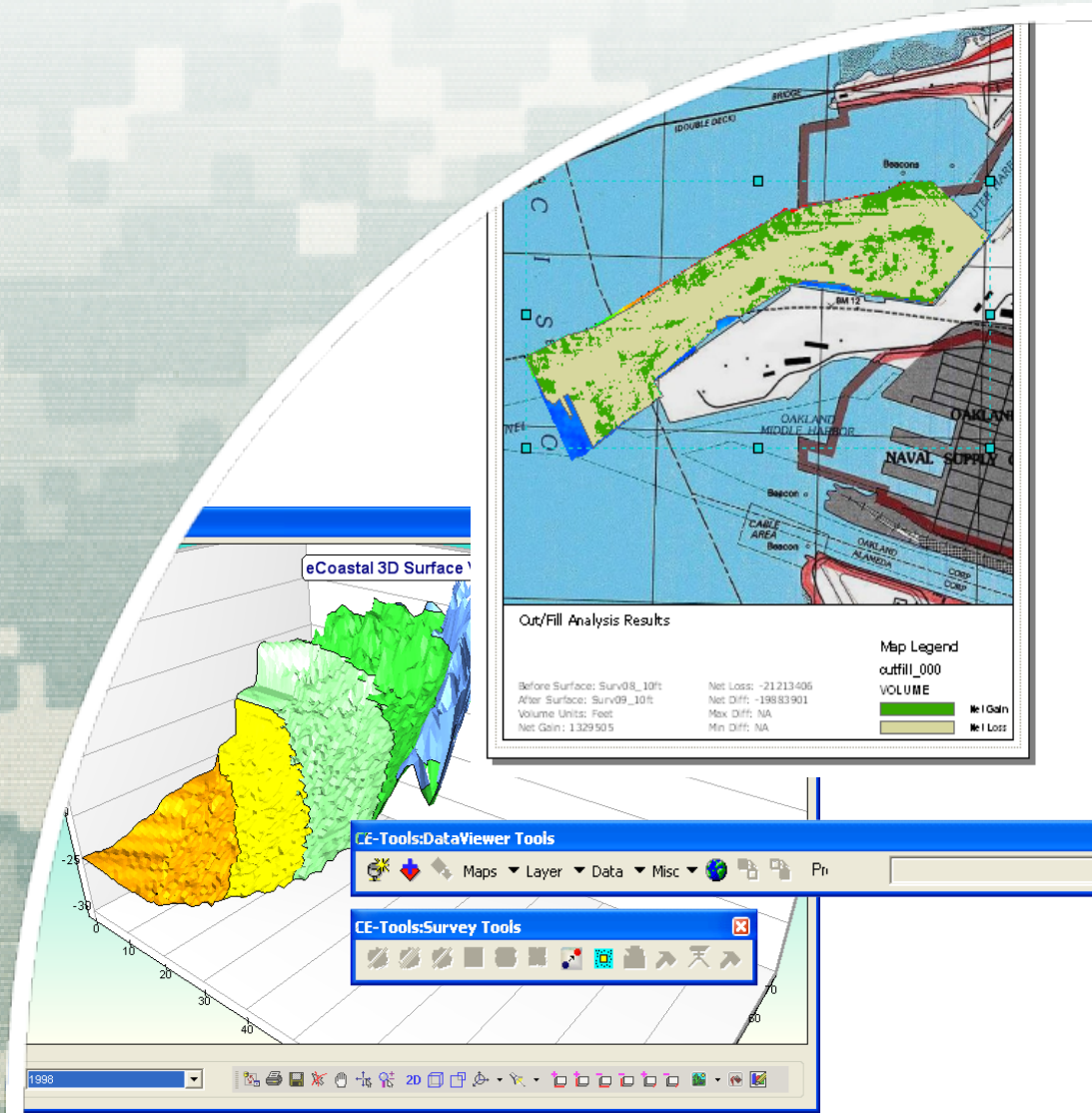
Survey Uploader and Delivery System (SUDS)



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SUDS Functionality

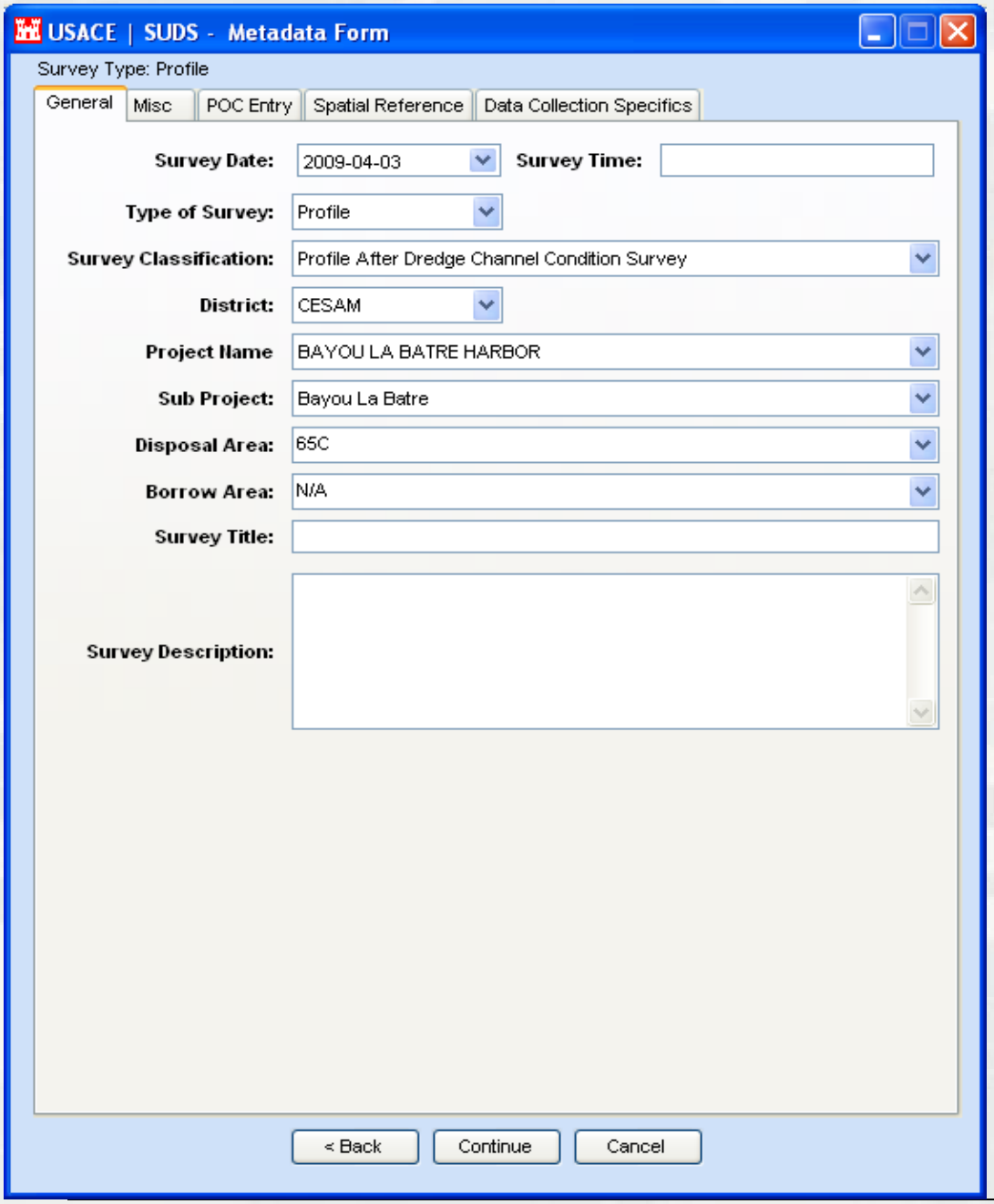
- Allows a Corps' survey technician or outside contractor to upload hydrographic or topographic surveys to a centralized database in their respective Districts
- Handling, storing, formatting, and converting of post processed ASCII data into useable data layers for analytical methods and visualization techniques for all types of engineering purposes
- Reduces data calls for the Hydrographic Survey offices by provide surveys to all uses in the respective Districts.

SUDS Workflow

Districts NCDB Database and/or file storage server

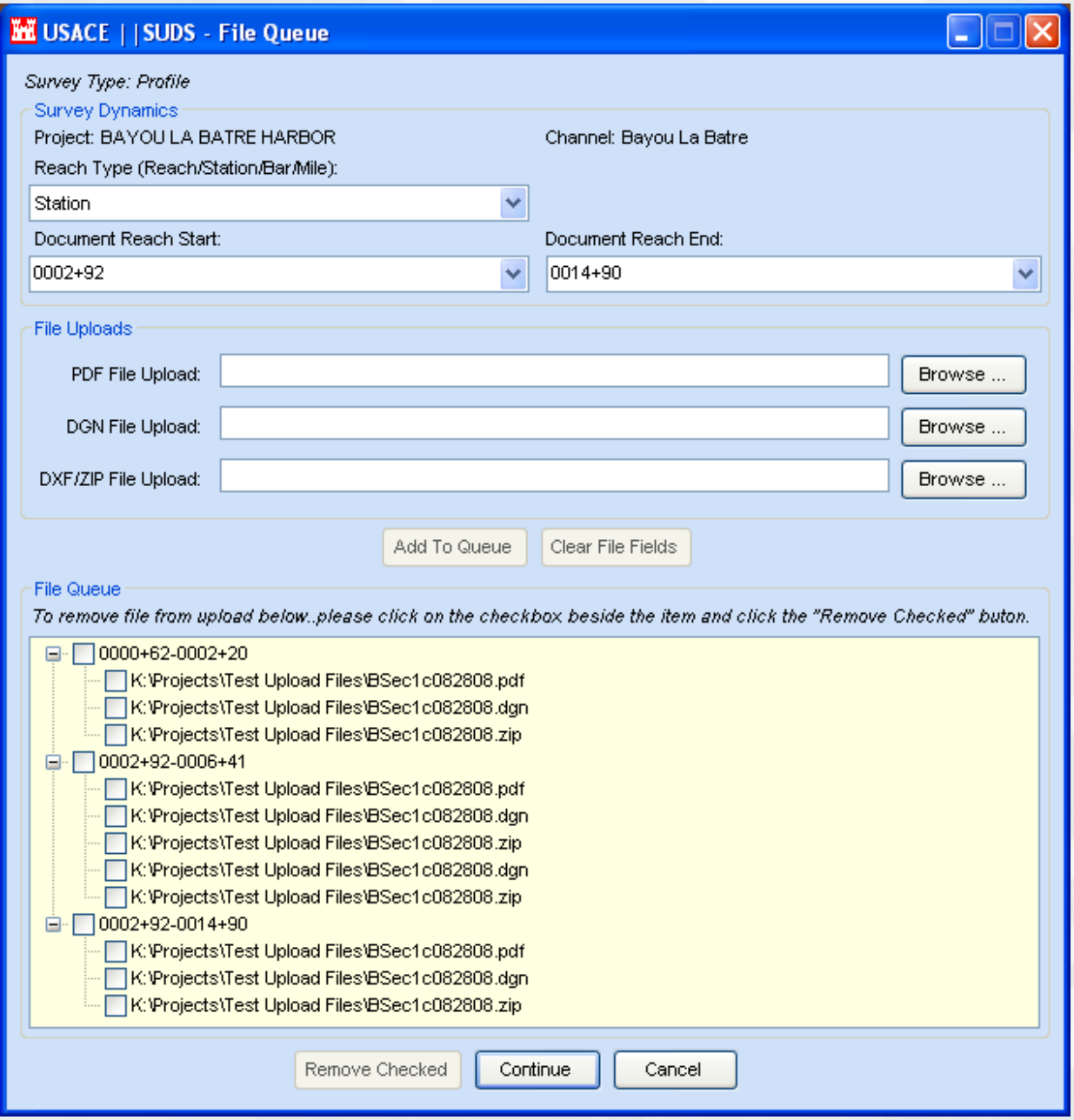
Processing center to process surveys for the CCI reporting

NCDB analyst uploading survey, metadata, and documents with SUDS



Up-loader Application

- Allow uploading of FGDC-compliant metadata
- Also provides utilities for creating FGDC-compliant metadata with all uploaded surveys

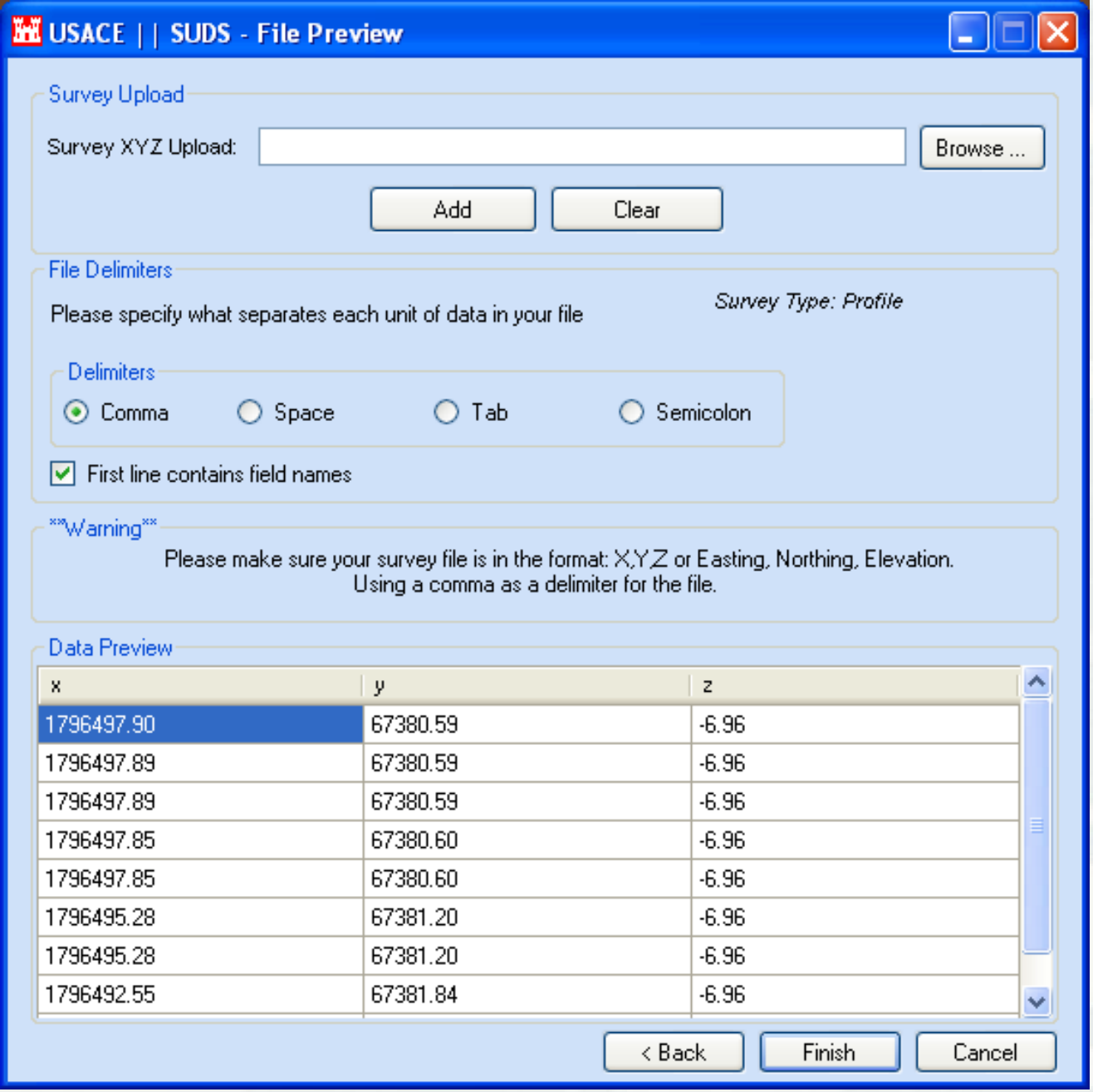


Up-loader Application

This form allows user to upload all files associated with a survey. Files can be formatted as PDF, DGN or DXF. All other formats can be zipped and uploaded here.

Up-loader Application

The survey upload page



Deployment Benefits

- Current Design allows for rapid deployment
  - Servers and personnel are all in place to rapidly process surveys and send the data to be housed in individual districts
  - Specialized software required to process survey data and other necessary datasets such as channel framework are already housed and in place in the processing node
  - Turnaround time will be **less than an hour** once automation is in place
- Consistent data acquisition and storage
  - With SUDS, all data will be collected and uploaded in a consistent format and have a constant storage across all Districts.
  - Ensures metadata is gathered for every survey

QA/QC Benefits

- Automatic QA/QC benefits built in
  - Check schema
  - Check metadata
  - Check projection information automatically
- If an error occurs the user will be notified of any mistakes for reloading or needed edits.
- Once the Processing Node scrubs data, the full dataset is sent back to the respective District for archiving.

Survey Delivery System

- All post processed will be stored within a series of database tables at the LOCAL District
  - No District data will be stored anywhere else.
- Will build GIS layer files and Metadata for all surveys
- Surveys will be searchable and users will be able to download them through the NCDB metadata search engine (ESRI's Geospatial Extension)

SUDS Additional Capabilities

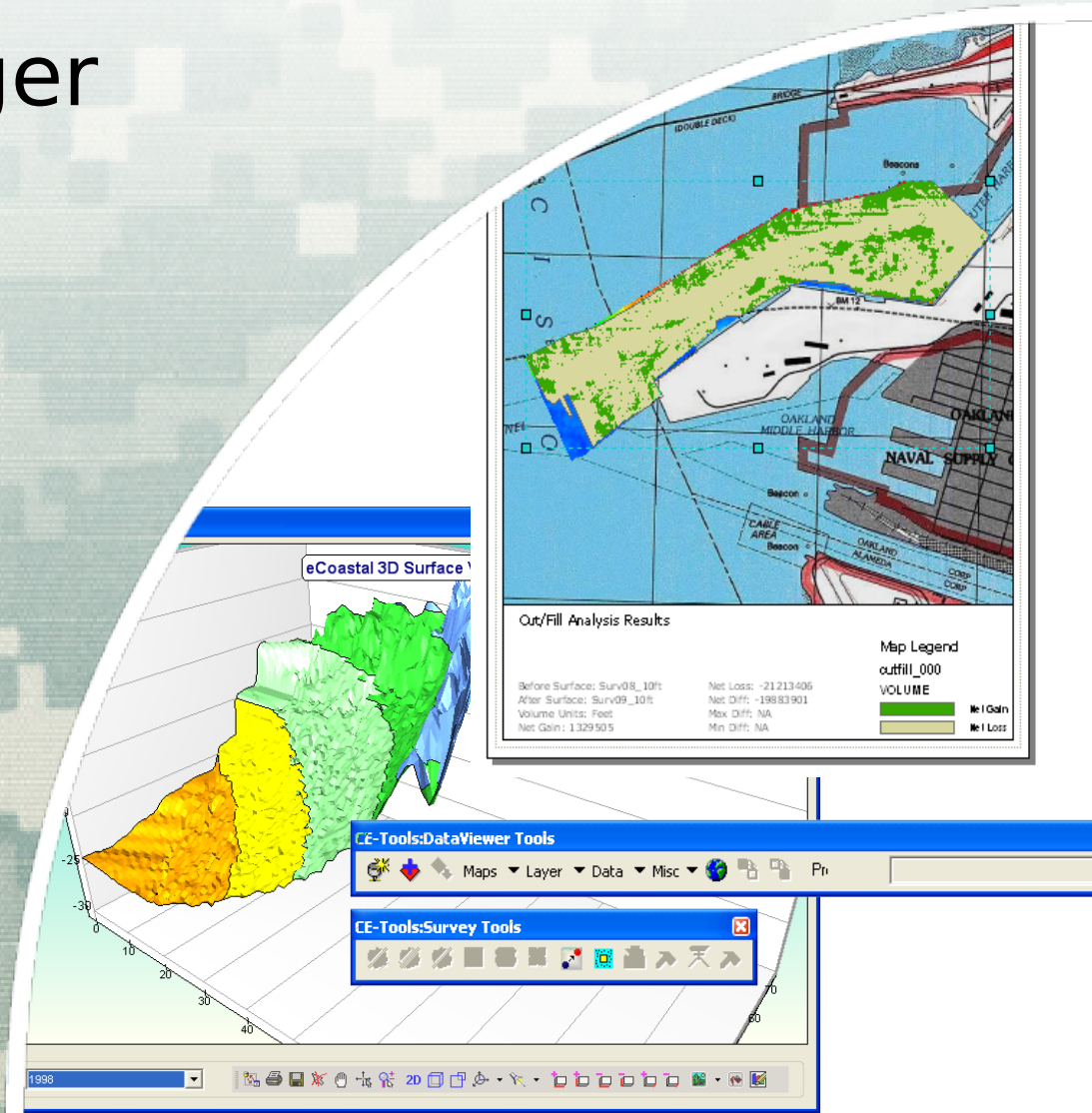
- Developed and tested Survey Upload and Delivery system, or SUDS.
  - Supports uploading surveys to respective Districts' navigation web pages
  - Supports HQ-requested channel condition indices reporting process
  - Relates national channel framework to uploaded and inventoried surveys
  - All uploaded surveys will also be compatible and accessible from the eCoastal Survey Analysis and Management System (SAMS), to provide scientific analysis and volumetric calculations
  - Will provide the ability to hyperlinked to the Navigation Gateway

Summary

- Saves time and cost by provide a suite of tools for survey data collection, search, and delivery
- Preserves district assets and institutional knowledge
- Provide data need to support the Channel condition indices reporting tools
- Facilitates automatic channel condition reporting

Planned Development

- Sediment Manager Database



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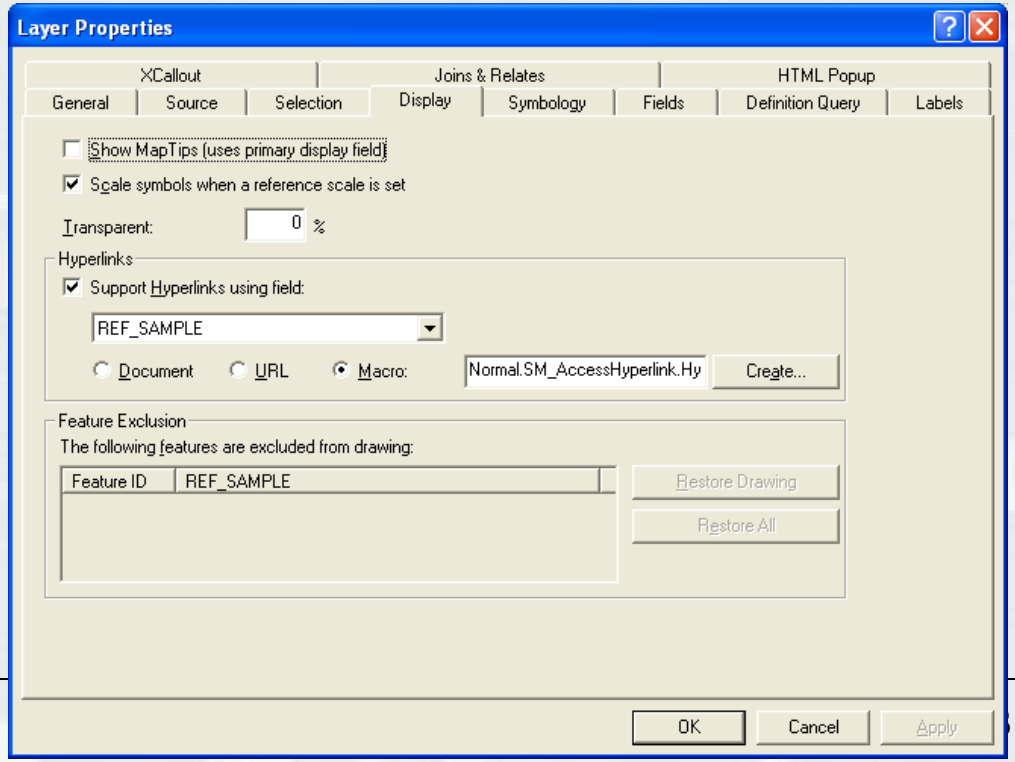
Sediment Testing Database

- All Sediment Testing data is stored in a series of non-spatial database tables.
  - BORING ID/SAMPLE ID is the unique identifier
  - These database tables can be related to the GIS feature point feature class
  - SQL database tables, with front-end of Microsoft Access forms.

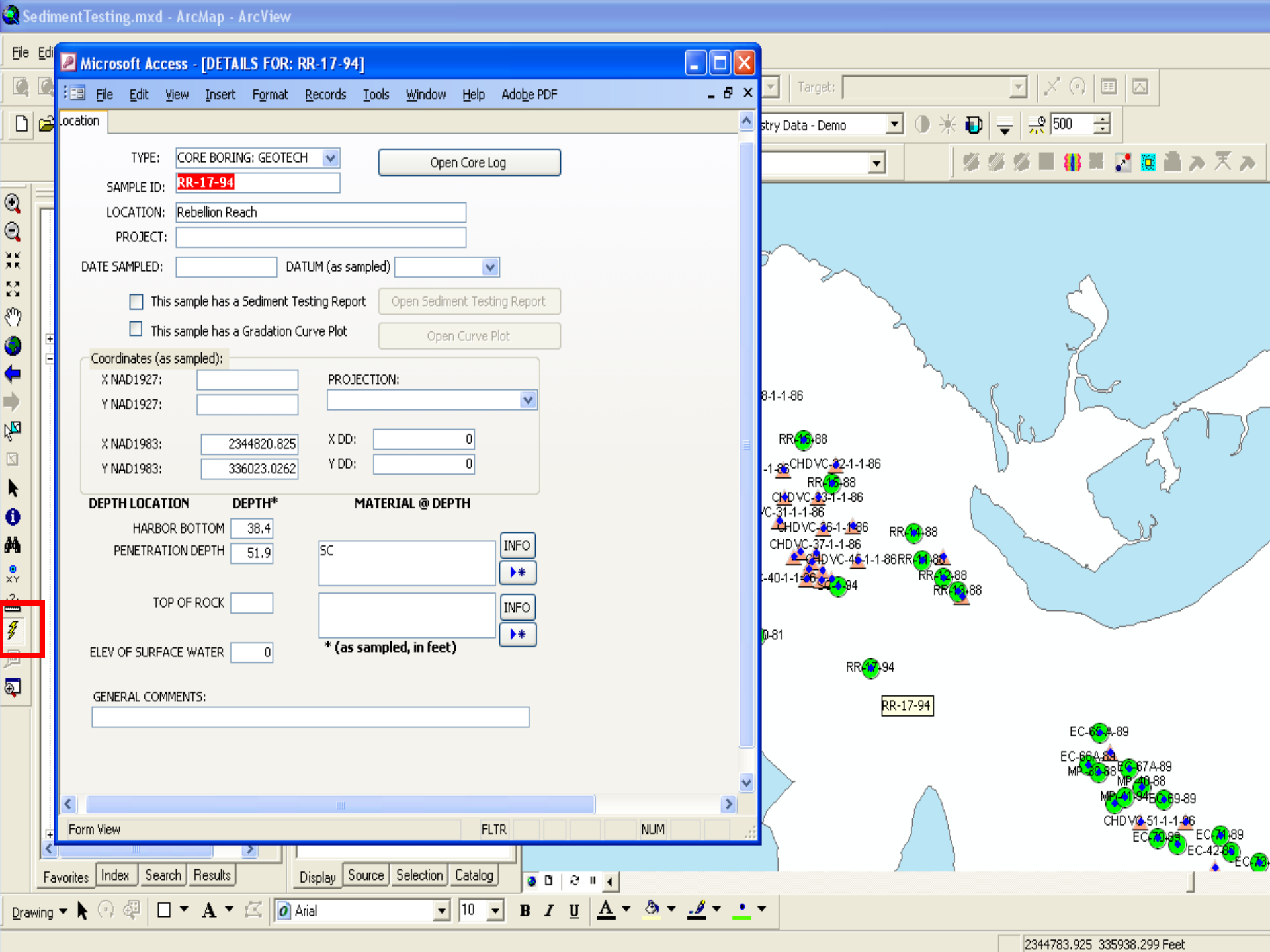
GIS Connector

- ArcMap's Hotlink tool is used to link unique identifier in feature class to Access database forms.



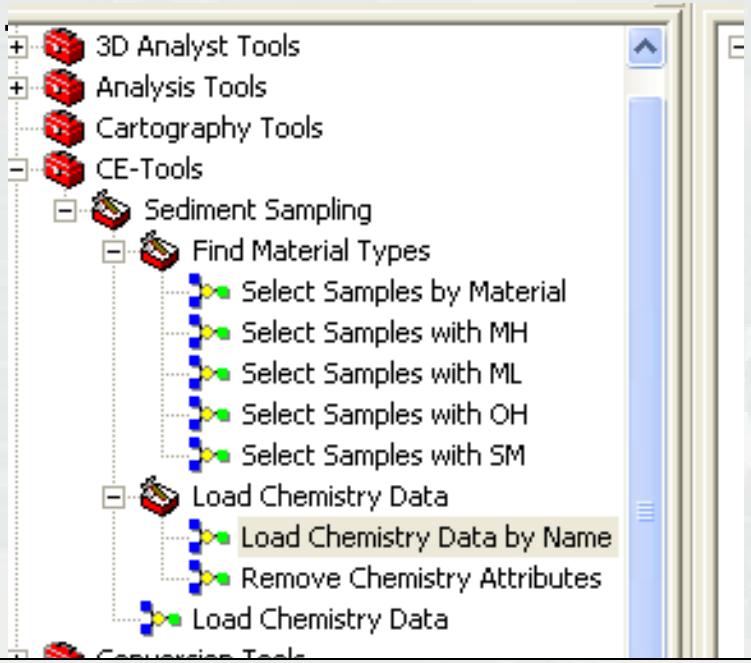
GIS Connector

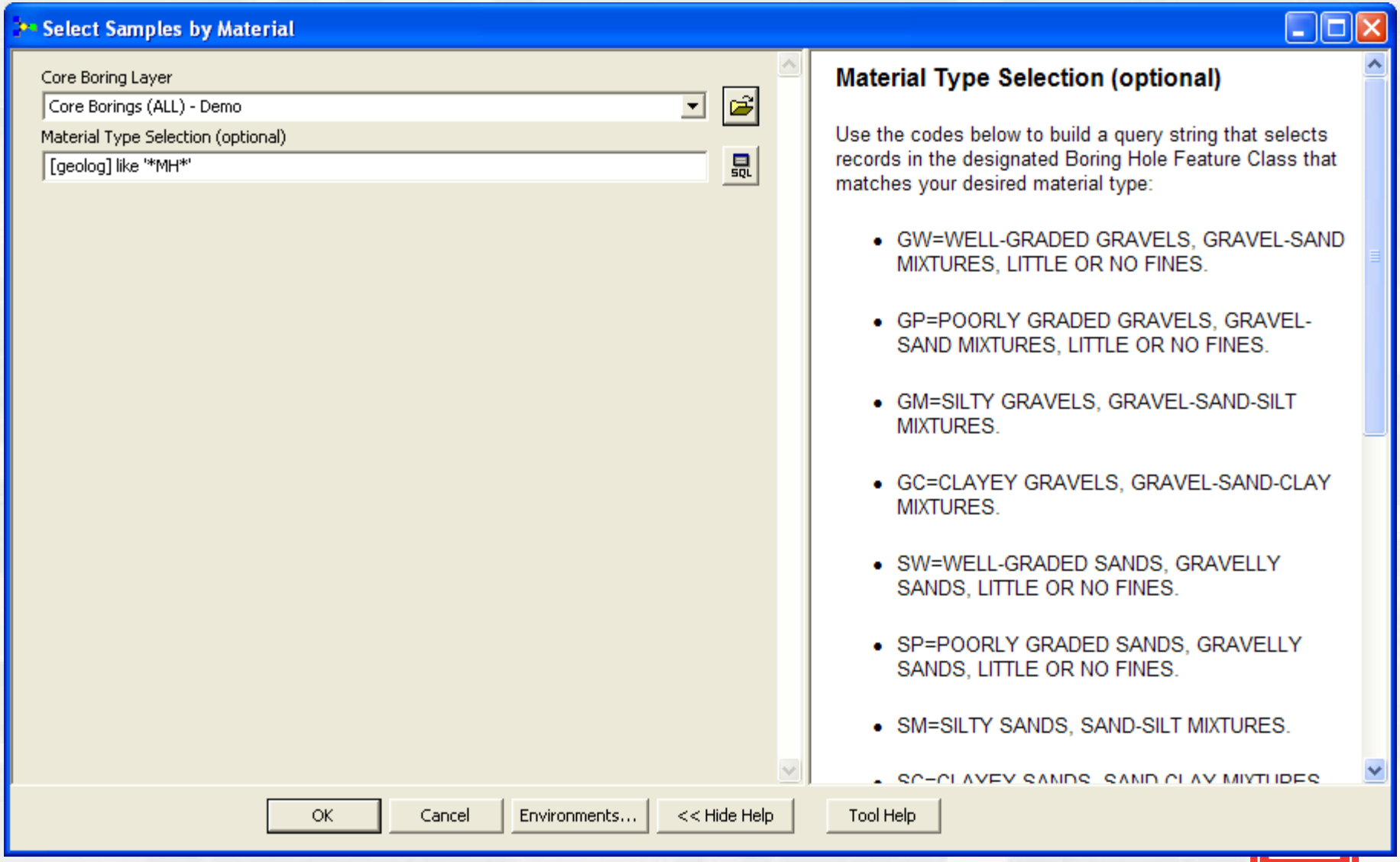
- ArcMap’s Normal Template will be edited a new module added (custom code to connect to Access database)
- Layer properties will be set (and saved) to connect to the new module.
- Using the hotlink tool, a user can click on the desired point and automatically retrieve database details.

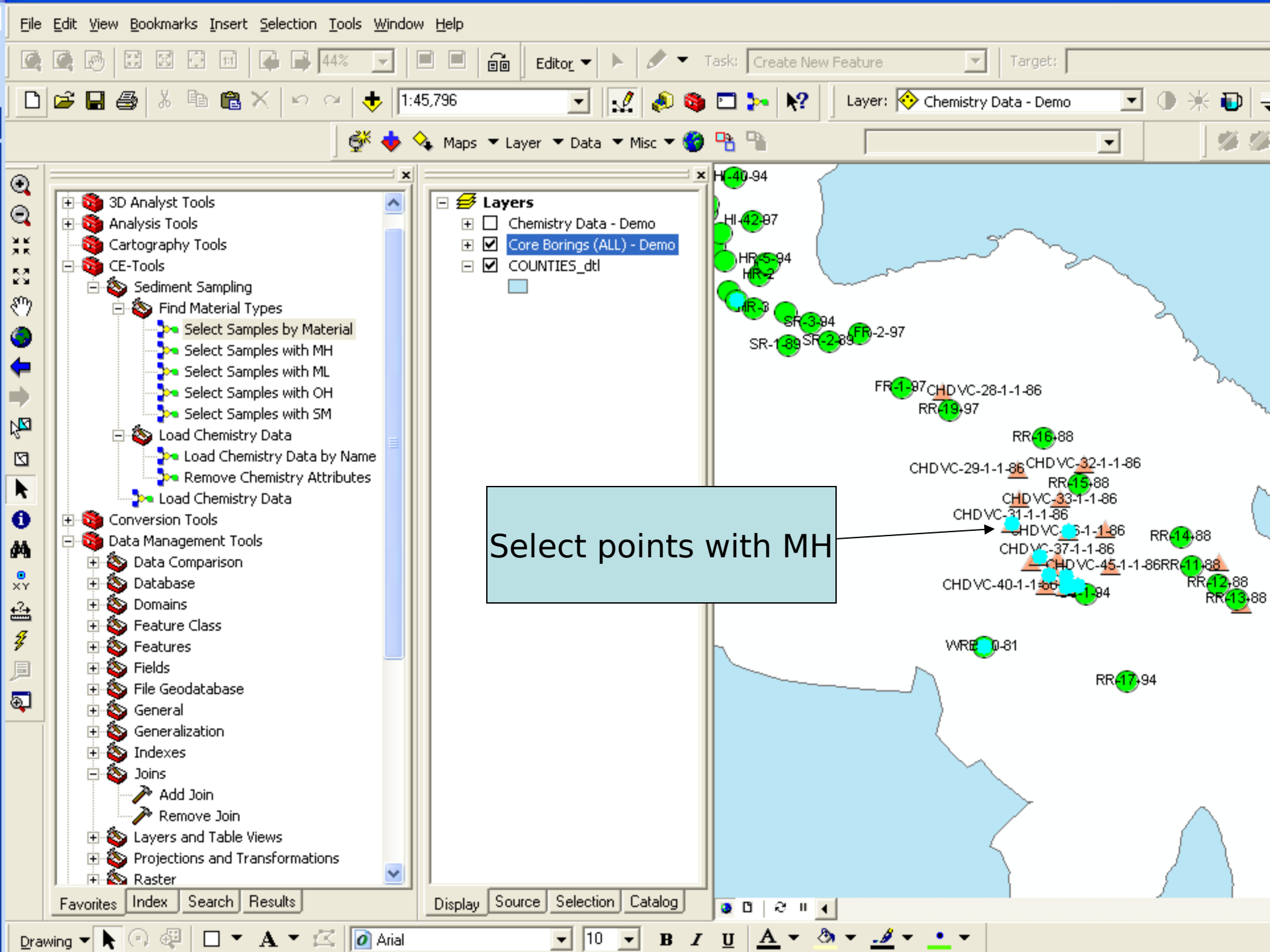

SedimentTesting.mxd - ArcMap - ArcView
Microsoft Access - [DETAILS FOR: RR-17-94]
File Edit View Insert Format Records Tools Window Help Adobe PDF
Location
TYPE: CORE BORING: GEOTECH
Open Core Log
SAMPLE ID: RR-17-94
LOCATION: Rebellion Reach
PROJECT:
DATE SAMPLED:
DATUM (as sampled)
This sample has a Sediment Testing Report
Open Sediment Testing Report
This sample has a Gradation Curve Plot
Open Curve Plot
Coordinates (as sampled):
X NAD1927:
Y NAD1927:
PROJECTION:
X NAD1983: 2344820.825
Y NAD1983: 336023.0262
X DD: 0
Y DD: 0
DEPTH LOCATION
DEPTH*
MATERIAL @ DEPTH
HARBOR BOTTOM 38.4
PENETRATION DEPTH 51.9
SC
INFO
TOP OF ROCK
INFO
ELEV OF SURFACE WATER 0
* (as sampled, in feet)
GENERAL COMMENTS:
Form View
FLTR
NUM
RR-17-94
Favorites Index Search Results
Display Source Selection Catalog
Drawing
Arial
10
2344783.925 335938.299 Feet

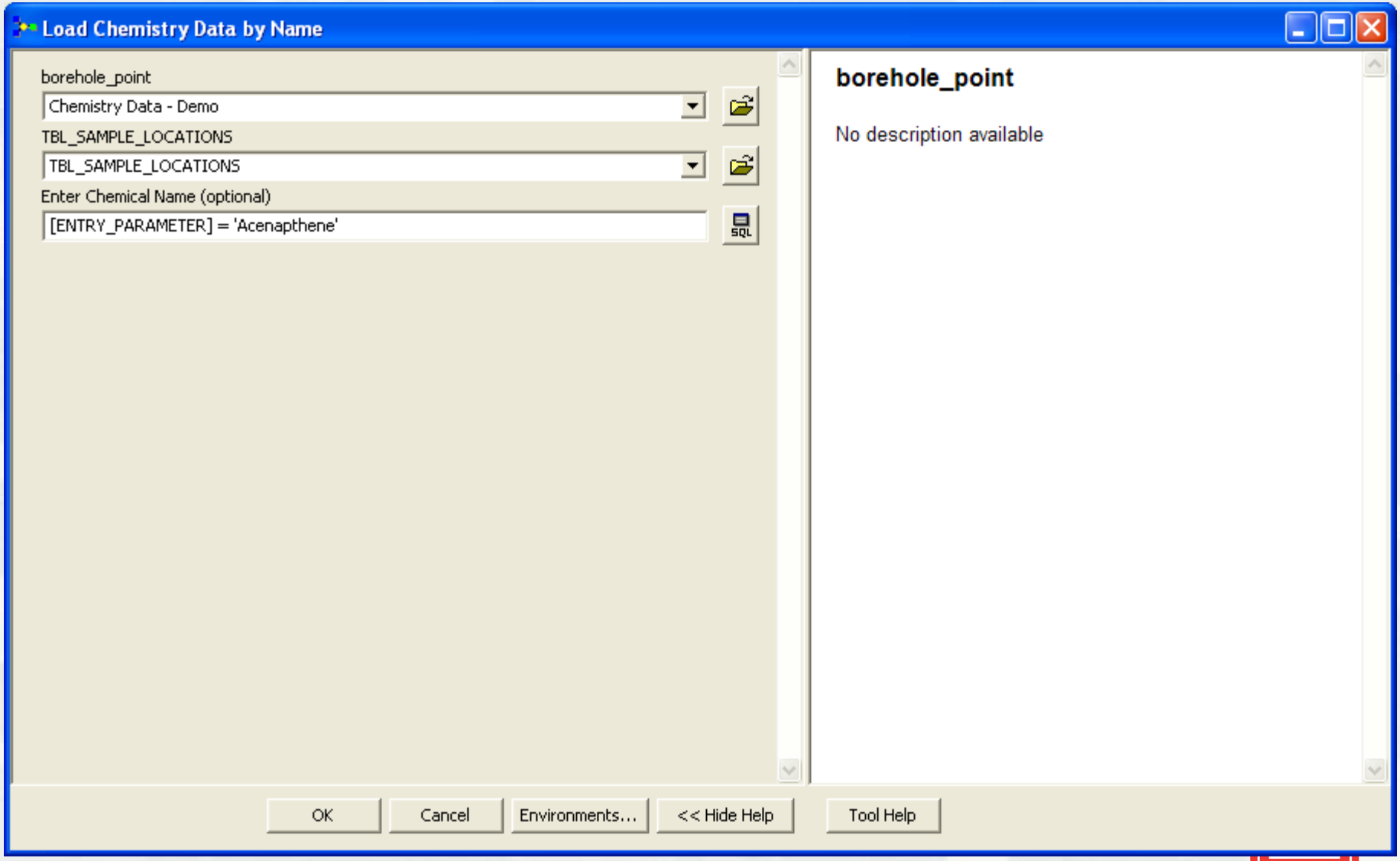
GIS Search Tools

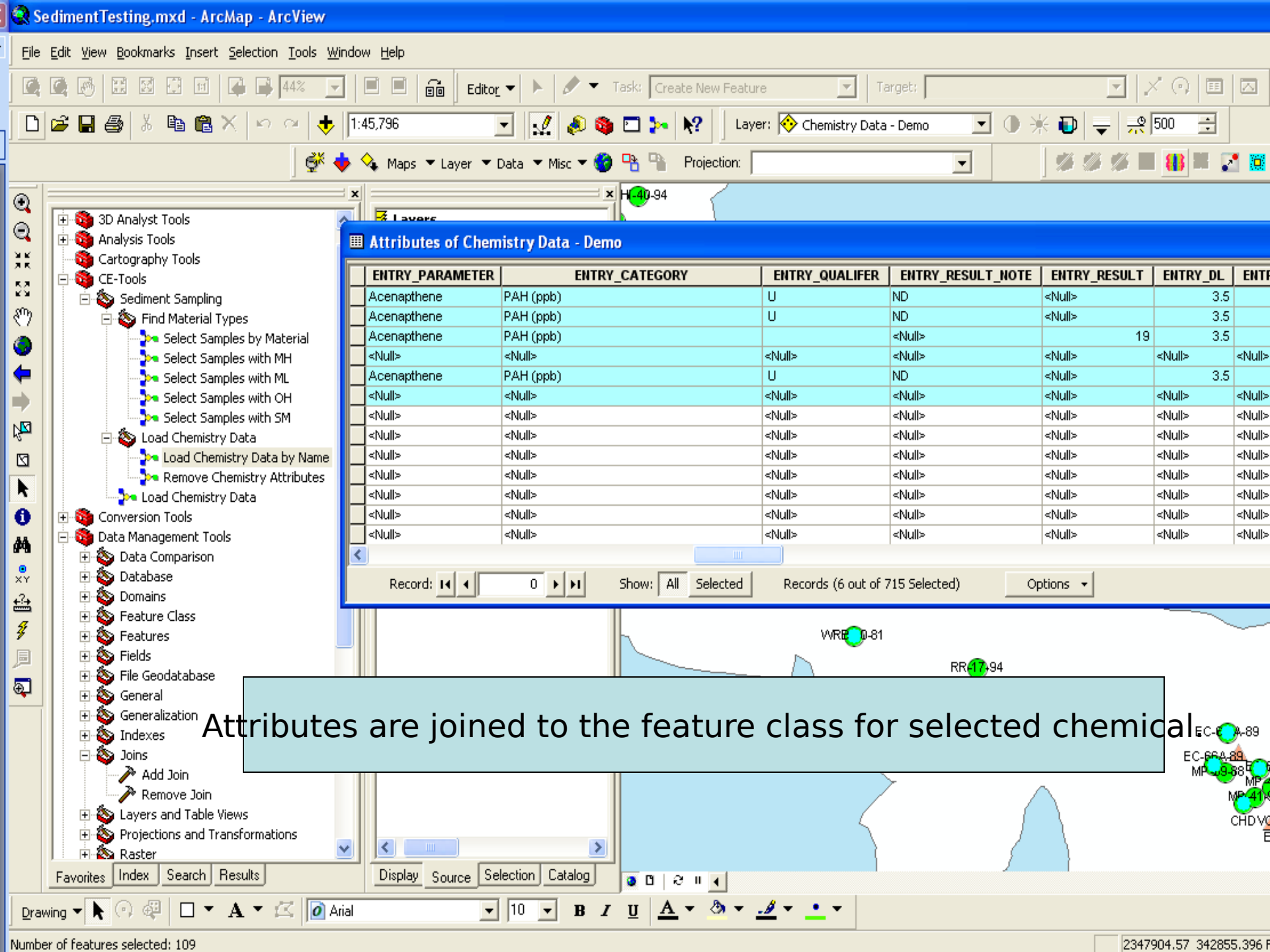
- ArcTool Data Models have been created to allow users to easily locate samples based on material




Select Samples by Material
Core Boring Layer
Core Borings (ALL) - Demo
Material Type Selection (optional)
[geolog] like '*MH*'
SQL
Material Type Selection (optional)
Use the codes below to build a query string that selects records in the designated Boring Hole Feature Class that matches your desired material type:
GW=WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
GP=POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
GM=SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES.
GC=CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES.
SW=WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.
SP=POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.
SM=SILTY SANDS, SAND-SILT MIXTURES.
OK
Cancel
Environments...
<< Hide Help
Tool Help


File Edit View Bookmarks Insert Selection Tools Window Help
Editor
Task: Create New Feature
Target:
1:45,796
Layer: Chemistry Data - Demo
Maps Layer Data Misc
3D Analyst Tools
Analysis Tools
Cartography Tools
CE-Tools
Sediment Sampling
Find Material Types
Select Samples by Material
Select Samples with MH
Select Samples with ML
Select Samples with OH
Select Samples with SM
Load Chemistry Data
Load Chemistry Data by Name
Remove Chemistry Attributes
Load Chemistry Data
Conversion Tools
Data Management Tools
Data Comparison
Database
Domains
Feature Class
Features
Fields
File Geodatabase
General
Generalization
Indexes
Joins
Add Join
Remove Join
Layers and Table Views
Projections and Transformations
Raster
Favorites Index Search Results
Layers
Chemistry Data - Demo
Core Borings (ALL) - Demo
COUNTIES_dtl
Display Source Selection Catalog
Select points with MH
CHDVC-28-1-1-86
CHDVC-29-1-1-86
CHDVC-32-1-1-86
CHDVC-33-1-1-86
CHDVC-31-1-1-86
CHDVC-37-1-1-86
CHDVC-45-1-1-86
CHDVC-40-1-1-86
RR-19-97
RR-16-88
RR-15-88
RR-14-88
RR-11-88
RR-12-88
RR-13-88
RR-17-94
FR-1-97
FR-2-97
SR-3-94
SR-2-89
SR-1-89
Drawing
Arial
10


Load Chemistry Data by Name
borehole_point
Chemistry Data - Demo
TBL_SAMPLE_LOCATIONS
TBL_SAMPLE_LOCATIONS
Enter Chemical Name (optional)
[ENTRY_PARAMETER] = 'Acenapthene'
SQL
borehole_point
No description available
OK
Cancel
Environments...
<< Hide Help
Tool Help


SedimentTesting.mxd - ArcMap - ArcView
File Edit View Bookmarks Insert Selection Tools Window Help
Editor
Task: Create New Feature
Target:
1:45,796
Layer: Chemistry Data - Demo
Maps Layer Data Misc
Projection:
3D Analyst Tools
Analysis Tools
Cartography Tools
CE-Tools
Sediment Sampling
Find Material Types
Select Samples by Material
Select Samples with MH
Select Samples with ML
Select Samples with OH
Select Samples with SM
Load Chemistry Data
Load Chemistry Data by Name
Remove Chemistry Attributes
Load Chemistry Data
Conversion Tools
Data Management Tools
Data Comparison
Database
Domains
Feature Class
Features
Fields
File Geodatabase
General
Generalization
Indexes
Joins
Add Join
Remove Join
Layers and Table Views
Projections and Transformations
Raster
Favorites Index Search Results
Display Source Selection Catalog
Attributes of Chemistry Data - Demo
ENTRY_PARAMETER | ENTRY_CATEGORY | ENTRY_QUALIFER | ENTRY_RESULT_NOTE | ENTRY_RESULT | ENTRY_DL
Acenapthene | PAH (ppb) | U | ND | <Null> | 3.5
Acenapthene | PAH (ppb) | U | ND | <Null> | 3.5
Acenapthene | PAH (ppb) | | <Null> | 19 | 3.5
<Null> | <Null> | <Null> | <Null> | <Null> | <Null>
Acenapthene | PAH (ppb) | U | ND | <Null> | 3.5
Record: 0
Show: All Selected
Records (6 out of 715 Selected)
Options
Attributes are joined to the feature class for selected chemical
Drawing
Arial
10
Number of features selected: 109
2347904.57 342855.396

District Examples

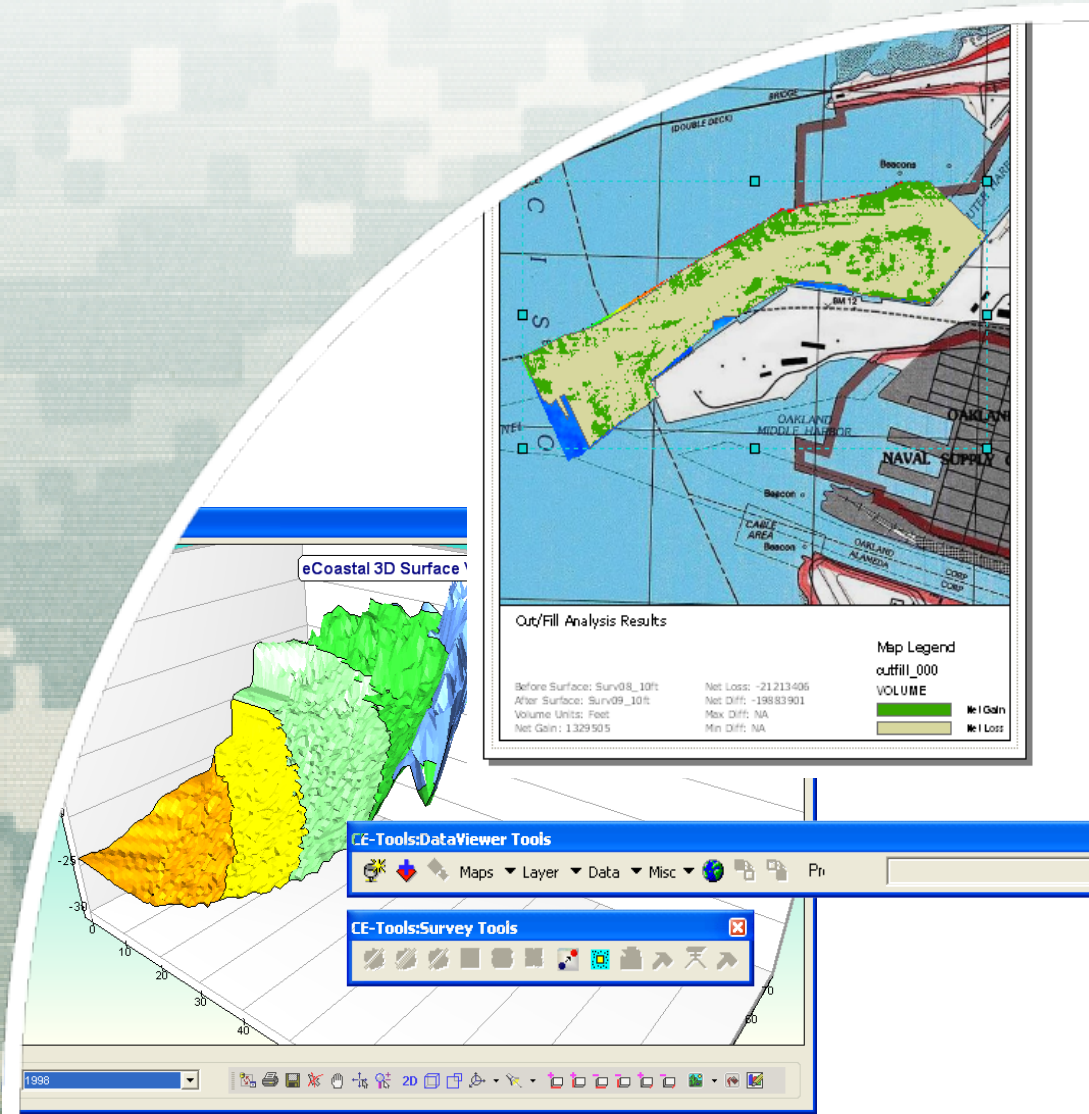
2008 – 2010 Implementations

New Orleans

Buffalo

San Francisco

Charleston



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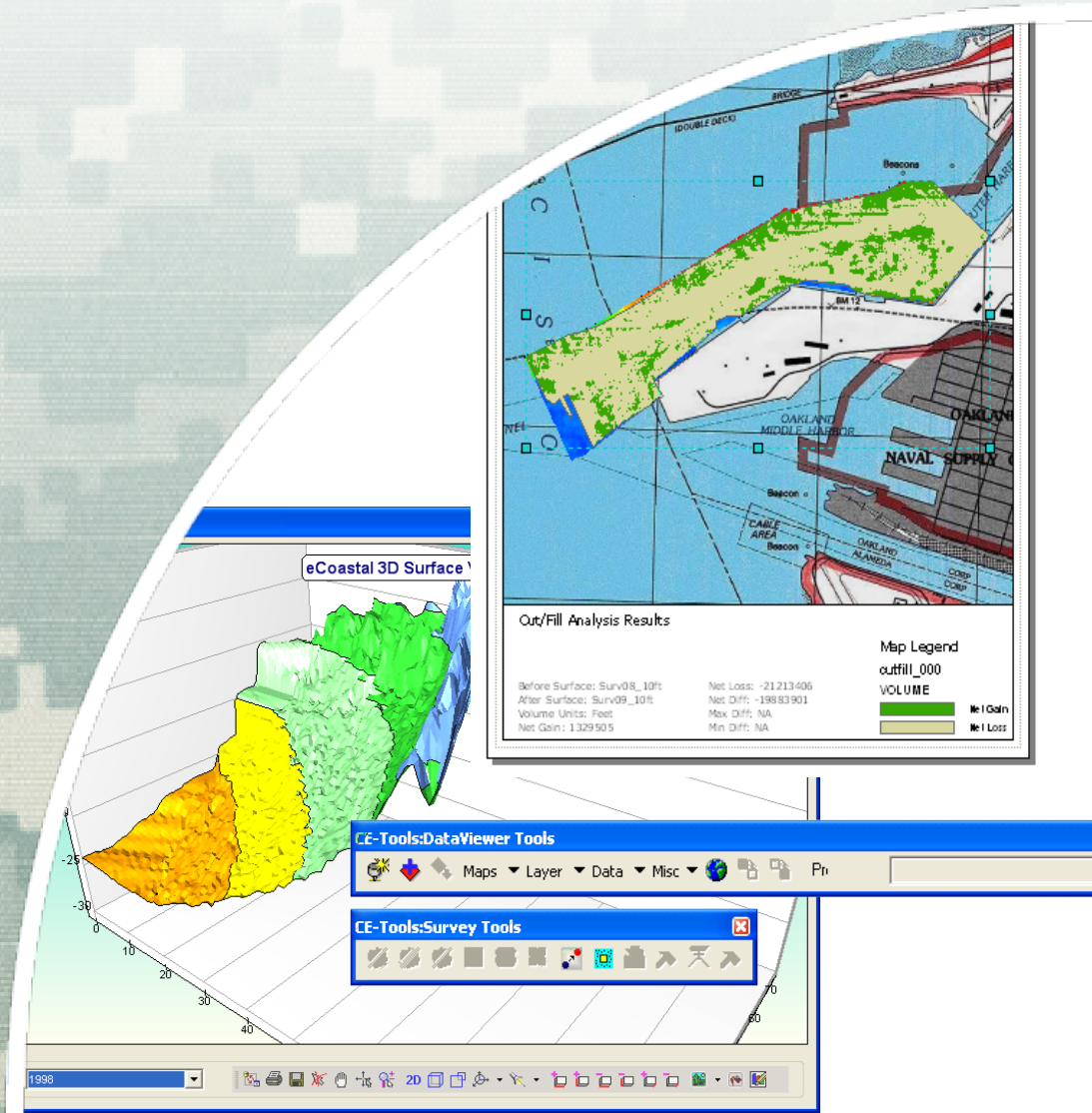
Level of Effort

- Each District funded Mobile to setup the necessary server and database architecture.
- Populated database basemap (GDT) and data for a minimal of one Pilot Project.
- Populated non-spatial database to support the custom toolbars.
- Initial Tech Transfer and End User training (1 to 3 days) on ArcMap tools.

Keys to Success

- Support is vital to the continued success
  - Staff needed to be dedicated to support the technology of the data and the user's of the data.
  - In a number of Districts there is a big disconnect between the "GIS Database" and the end users who really need access to the data. These end users are typically *NOT* GIS people, but engineers who need data for analysis.
- Enforce a Standard Operating Procedure
- Keep database current and promote usage of applications.

Closing Remarks



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